ONKYO SERVICE MANUAL

FULLY AUTOMATIC TURNTABLE
Model CP-1020F

120V model

Universal model

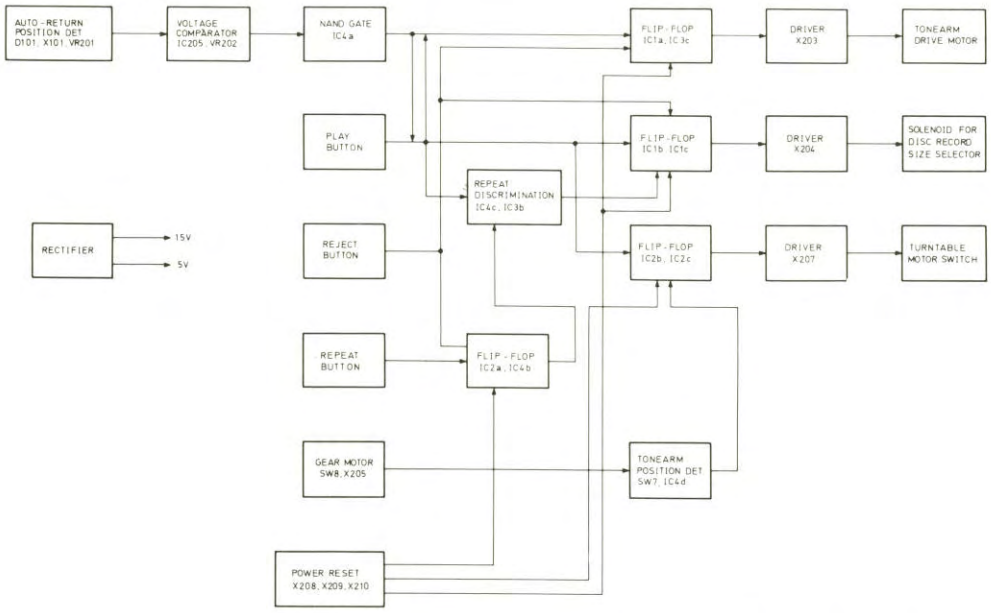
1. SPECIFICATIONS

Type:	2-speed fully-automatic turntable with manual lifter
Turntable Platter:	31 cm (12-3/16″) Aluminum diecast
Motor:	Brushless, coreless, slotless, FG servo DC direct drive
Speeds:	33-1/3 rpm, 45 rpm
Wow & Flutter:	0.035% WRMS
Signal-to-Noise Ratio:	72 dB (DIN B)
Tonearm:	Static balanced straight pipe
Effective Arm Length:	224 mm (8-13/16″)
Overhang:	13 mm (1/2″)
Maximum Tracking Error: (Only Universal model)	+3 degrees, −1 degree
Cartridge	
Type:	Moving magnet (OC-39M)
Frequecy Response:	18Hz −25,000 Hz
Recommended Load Impedance:	47 kohms
Recommended Tracking Force:	2 grams
Compliance:	8×10^{-6} cm/dyne
Output Voltage:	4.0 mV
Stylus Tip:	0.5 mil (13 micron) diamond
Replacement Stylus:	DN-39 ST
Power Supply Rating:	AC110-120, 220-240V 50/60 Hz or 240V, 50 Hz
Power Consumption:	6 watts
Dimensions (W x D x H):	453 mm x 370 mm x 133 mm 17-7/8″ x 14-1/2″ x 5-1/4″
Weight:	5.8 kg (13 lbs.)
(Only U.S.A. Model)	
Usable Cartridge Weight:	5 ~ 8 gr.
Power Supply:	120V 60Hz

In the interest of further product improvements, specifications are subject to change without notice.

ONKYO®
AUDIO COMPONENTS

2. BLOCK DIAGRAM



Lead-In and Return Control Circuits

Note 1. Refer to the circuit diagram and block diagram.
2. "L and "H denote TTL positive logic, while the figures in circles denote IC pin terminal numbers and printed circuit board terminal numbers.
3. FF denotes flip-flop.

Play Operation

- When IC2b (3) is dropped to "L" level, IC2b(6) switched over to "H" and IC2c(8) to "L", resulting in the turntable motor being started up by the cut off action of X7.
- When IClb(3) is dropped to"L" level and IClb(6) switched to "H" level to turn X4 on, the record size selector solenoid is activated.
- When ICla (1) is dropped to "L" level and ICla(12) switched to "H" to turn X3 on, the tonearm drive motor is started.

Reject Operation

- When ICla(2) is dropped to "L" level and ICla(12) switched to "H" to turn X3 on, the tonearm drive motor is again started up.
- When IClc(10) is dropped to "L" level, IClc(8) is switched to "H" and IClb(6) to "L" to cut X4 off, thereby inhibiting the record size selector solenoid.

Repeat Operation

- When IC4b(4) is dropped to "L" level, IC4b(6) is switched to "H" and IC3b(5) kept at "H". When the tonearm returns automatically at the end of the record, IC4a(3) generates an L pulse (U) which is then inverted by IC4c to become an H pulse. When this pulse is applied to IC3b(6), another L pulse is generated, resulting in IClb(6) being switched to "H" level to turn X4 on and activate the record size selector solenoid.
  To release the reject mode, simply press the REJECT key. In this case, IC2a(2) is dropped to "L" level, IC2a(12) switched to "H" and IC4b(6) to "L", followed by IC3b(5) being switched to "L" and IC3b(6) to "H". Then in conjunction with the reject operation described above, the repeat mode is released by reject aciton. In other words, the repeat mode is maintained only as long as IC3b(5) is kept at "H" level.

Restoration of Initial Condition

When the tonearm drive motor is started up for play or reject operations, the main gear is also rotated. SW8 coupled to the main gear restores all FFs to the initial condition.

Auto-Return

When an eccentric pin of the lead arm coupled to the tonearm is inserted between D101 and Q101, it serves as a shut-off mechanism which turns the Q101 photo transistor off. The difference in voltage is applied to a comaparator via IC5(3), resulting in the generation of a positive pulse which serves as the comarator output appearing at IC5(6). This pulse is subjected to rectification and inversion at the CR and IC4a, thereby forming a negative pulse which is applied to ICla(1) and IC4c(12) and (13). This is then followed by return or repeat operation in the same way as described above.

Manual Play

When the tonearm is raised from the arm rest by hand, the SW7 arm switch drops IC2b(4) to "L" level, resulting in IC2b(6) being switched to "H" and ICla(1) to "L", thereby starting up the turntable motor by cut off of X7.

Stopping the Turntable Motor

- When the tonearm is returned manually to the arm rest IC2c(11) is switched instantaneously to "L" level and IC2c(8) to "H", thereby turning X7 on to bring the turntable motor to a stop.
- When the main gear starts to rotate during reject or auto-return mode, the SW8 gear switch is set to position (21) during rotation, and to position (22) end the end of one revolution. As soon as this single revolution is completed, the base of X5 is switched to "L" level, resulting in a cut off action, and IC4d(10) being switched to "H". The SW7 arm switch is at position (24) (on the arm rest) at this time, and IC4d(9) is at "H" level. At the instant that IC4d(10) is switched to "H", IC4d(8) is switched to "L", IC2c(11) to "L", and IC2c(8) to "H", resulting in X7 being turned on to stop the turntable motor.

Power On Reset

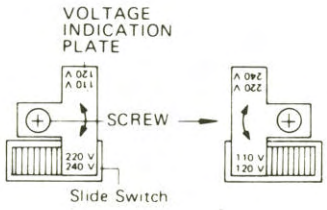
When the power switch is turned on, the FFs at X8, X9 and X10 are rest to their prescribed initial state. (X9 is cut off immediately, while X8 and X10 are cut off according to their respective time constants).

3. SERVICE PROCEDURES AND ADJUSTMENTS

1. VOLTAGE CONVERSION

This turntable may be set to operate at either 110V–120V or 220V–240V at 50Hz to 60Hz. The voltage selector switch is under the turntable. If a voltage change is necessary, remove the lock plate, switch to the proper voltage, and replace the plate.

CAUTION: DISCONNECT POWER SUPPLY CORD FROM AC OUTLET BEFORE CONVERTING VOLTAGE.



2. Speed Adjustment

(a) Set the 33rpm and 45rpm speed adjustment controls to center positons.

(b) Set the speed selector to 33 rpm, and adjust VR-301 so that the stroboscope stripes appear to be stationary.

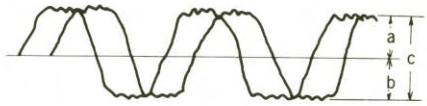
(c) Then switch over to 45rpm, and adjust VR-302 to obtain the same stationary stroboscope condition.

3. Wow and Flutter Adjustment

When Using Dual-Image Oscilloscope

Connect the oscilloscope leads between terminal no.12 ang ground and terminal no.13 and ground in the motor drive circuit board.

Adjust VR-303 and VR-304 so as to make a and b in the following diagram the same size, and adjust VR-305 in oder to obtain the same amplitude.



When Using 3kHz Test Record

Play the 3kHz test record, and adjust VR303 ~ VR-305 so as reduce wow and flutte to a minimum.

4. Return Position Adjustment

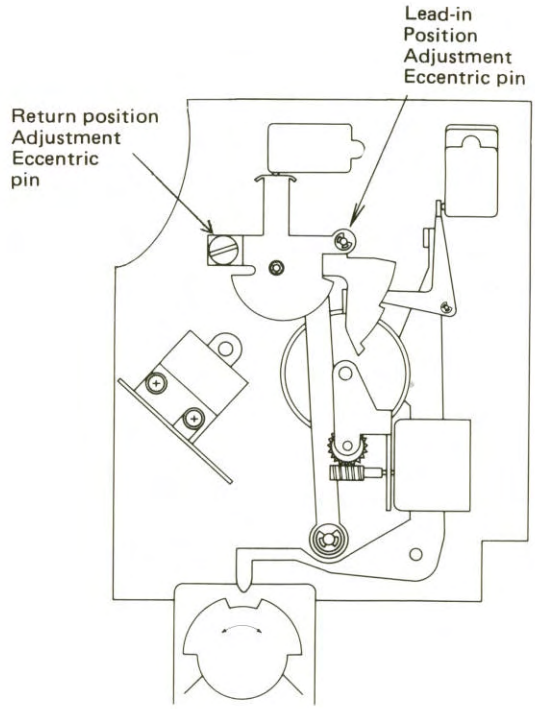
Connect a DC voltmeter between pins 9 and 10 of the control circuit board, and adjust VR-201 so that the voltage lies within the 0.2±0.05V range.

Set the speed selector to 33rpm, and reconnect the voltmeter to pins 9 and 11. Adjust VR-221 to obtain a reading of 0.8±0.05V.

Then adjust the return position by the large eccentric pin attached to the tonearm base.

5. Lead-In Position Adjustment

The lead-in position is adjusted by means of the small eccentric pin attached to the base of the tonearm.



4. PARTS LIST

Universal model

CIRCUIT NO.	PARTS NO.	DESCRIPTION
Z001	242301	MSS-8612A, Turntable ass'y (UU)
	242332	MSS-8612D, Turntable ass'y (Q)
21	24505078-1	Control p.c.b.
24-1	24505082	Power supply p.c.b.
29	24502078-1	DD motor control p.c.b.
SW1	25035149	NPS-121-L113P, Power switch
SW2, SW3	24503086	Push switch
SW4-SW6	24503087	Push switch
SW7	24503049	K-3, Microswitch
SW8	24503040	K-1, Microswitch
SW9	250159	Voltage selector switch (UU)
VR101, VR102	5146015	VM10A-500ΩB, Variable resistor
QPT101	226001	PT501A, Phototransistor
D101	245036	GL-514, L.E.D.
	24502080	Solenoid ass'y
	24502077	DML-148Q-1, DC motor
	24509163	Cabinet board ass'y
	24504272	Volume knob
	28320303	Push button
54	24501221	Arm rest ass'y
	24501224	Arm rest
	24501225	Hook
35	24501235	Tonearm ass'y with cartridge
	24501236	Tonearm ass'y
	24501227	Tonearm screw
	24501237	Counter weight
	24501223	Headshell
	24501183	OC-39M, Cartridge
	24501185	DN-39ST, Stylus
	24501186	Stylus cover
Z508	230329	Power transformer
Z605	24509126	Dust cover
Z607	24502082	Turntable platter

120V model

CIRCUIT NO.	PARTS NO.	DESCRIPTION
Z001	242310	MSS-8612B, Turntable ass'y
21	2405078-2	Control p.c.b.
24-1	24505082	Power supply p.c.b.
29	245078-2	DD motor control p.c.b.
SW1	25035150	NPS-111-L114P, Power switch
SW2, SW3	24503086	Push switch
SW4-SW6	24503087	Push switch
SW7	24503049	K-3, Microswitch
SW8	24503040	K-1, Microswitch
VR101, VR102	5146015	VM10A-500ΩB, Variable resistor
QRT101	226001	PT501A, Phototransistor
D101	245036	GL-514, L.E.D.
	24502080	Solenoid ass'y
	24502077	DML-148Q-1, DC motor
	24509163	Cabinet board ass'y
	24504272	Volume knob
	28320303	Push button
54	24501221	Arm rest ass'y
	24501224	Arm rest
	24501225	Hook
35	24501242	Tonearm ass'y
	24501227	Tonearm screw
	24501237	Counter weight
	24501223	Headshell
Z508	230330	Power transformer
Z605	24509126	Dust cover
Z607	24502082	Turntable platter

DD MOTOR PC BOARD-PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	IC	
IC301, IC302	222465	NJM4558D
	Transistors	
X301	2210351,	2SC945 (K),
X302	2210350,	2SC945 (L),
X303	2211672 or	2SC2308 (B) or
X305	2211673	2SC2308 (C)
X304	2210803,	2SA733 (P),
	2211362 or	2SA844 (B) or
	2210980	2SA641 (F)
X306	2211853 or	2SD667 (C), or
X307	2211682	2SD468 (B)
X308	2211863 or	2SB647 (C) or
X309	2211562	2SB562 (B)
	Diodes	
D301	223126	1S1210
D302-D305	223851	W03B
ZD301, ZD302	223928	WZ061
	Resistors	
VR301-VR304	24509098	5K (B), Semi-fixed
VR305	24509106	200K (B), Semi-fixed
	Capacitors	
C301	352750471	4.7μF, 25V, Elect.
C306, C307	352780101	1μF, 50V, Elect.
C311, C312	352751021	1,000μF, 25V, Elect.
	Terminals	
	24506302	2P
	24506300	4P
	24506303	5P
	Fuseholder	
F903, F904	24506312	
	Fuse	
	252063	500mA (UU)
	252066	1A (120V)
	Motor	
	24502083	

CONTROL PC BOARD-PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	ICs	
IC201, IC202	222439 or 222481	SN7410 or HD7410
IC203, IC204	222425 or 222478	SN7400 or HD7400
IC205	222545	μPC741C
	Transistors	
X201, X202	2201082	2SC1061 (B)
X203, X204	2211772	2SC2001 (L)
X205, X207-X210	2210354	2SC945 (Q)
	Diodes	
D201	223866	RB-150
D202, D206, D211	223127	1S953
D204, D212	223851	F14C
ZD201	223964	RD12E (C)
ZD202	223947	HZ6A-3L
ZD203	223954	RD7.5E (C)
	Resistors	
VR201	5225015	N10HR10KBD, Semi-fixed
VR202	5225024	N10HR1KBD, Semi-fixed
R201	441722714	270Ω, 2W, Metal oxide film
R202	441724714	470Ω, 1W, Metal oxide film
	Capacitors	
C201	352754711	470μF, 25V, Elect.
C202, C203	352754701	47μF, 25V, Elect.
C204	352743301	33μF, 16V, Elect.
C205, C209, C210	352741001	10μF, 16V, Elect.
C206	352780101	1μF, 50V, Elect.
C211, C222	352780471	4.7μF, 50V, Elect.
C231	352751011	100μF, 25V, Elect.
	Connector posts	
	24506298	12P
	24506297	5P
	24506299	4P
	Terminals	
	24506302	2P
	24506301	3P
	24506300	4P
	Fuseholder	
	24506311	
	Fuse	
	252063	500mA (UU)
	252064	1A (120V)

POWER SUPPLY PC BOARD-PARTS LIST

Universal model

CIRCUIT NO.	PARTS NO.	DESCRIPTION
C101	24509154	4,700pF, AC250V, Capacitor
R101	431521235	12kΩ, 1/2W, Solid resistor
	24506311	Fuseholder
F101	252065	0.5AT, Fuse
	24505087	Fuse label
	211003	NE-2HU, Neon lamp

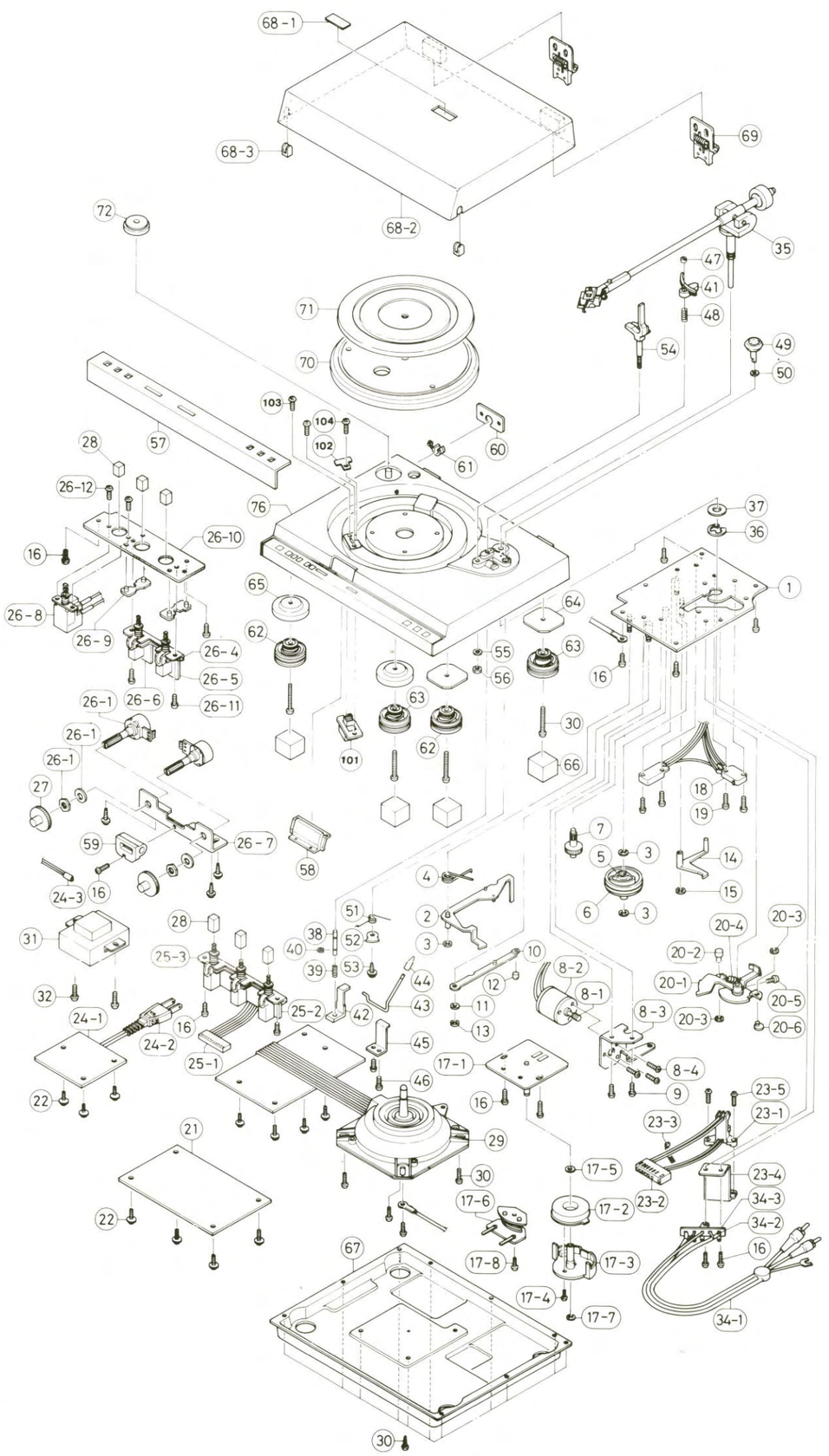
POWER SUPPLY PC BOARD-PARTS LIST

120V model

CIRCUIT NO.	PARTS NO.	DESCRIPTION
C101	24509155	0.047 μF, AC125V, Capacitor
R101	431521235	12kΩ, 1/2W, Solid resistor
	211003	NE-2HU, Neon lamp

NOTE: (UU): Only Universal model
(120V): Only 120V model
(Q): Only 240V model

5. EXPLODED VIEW

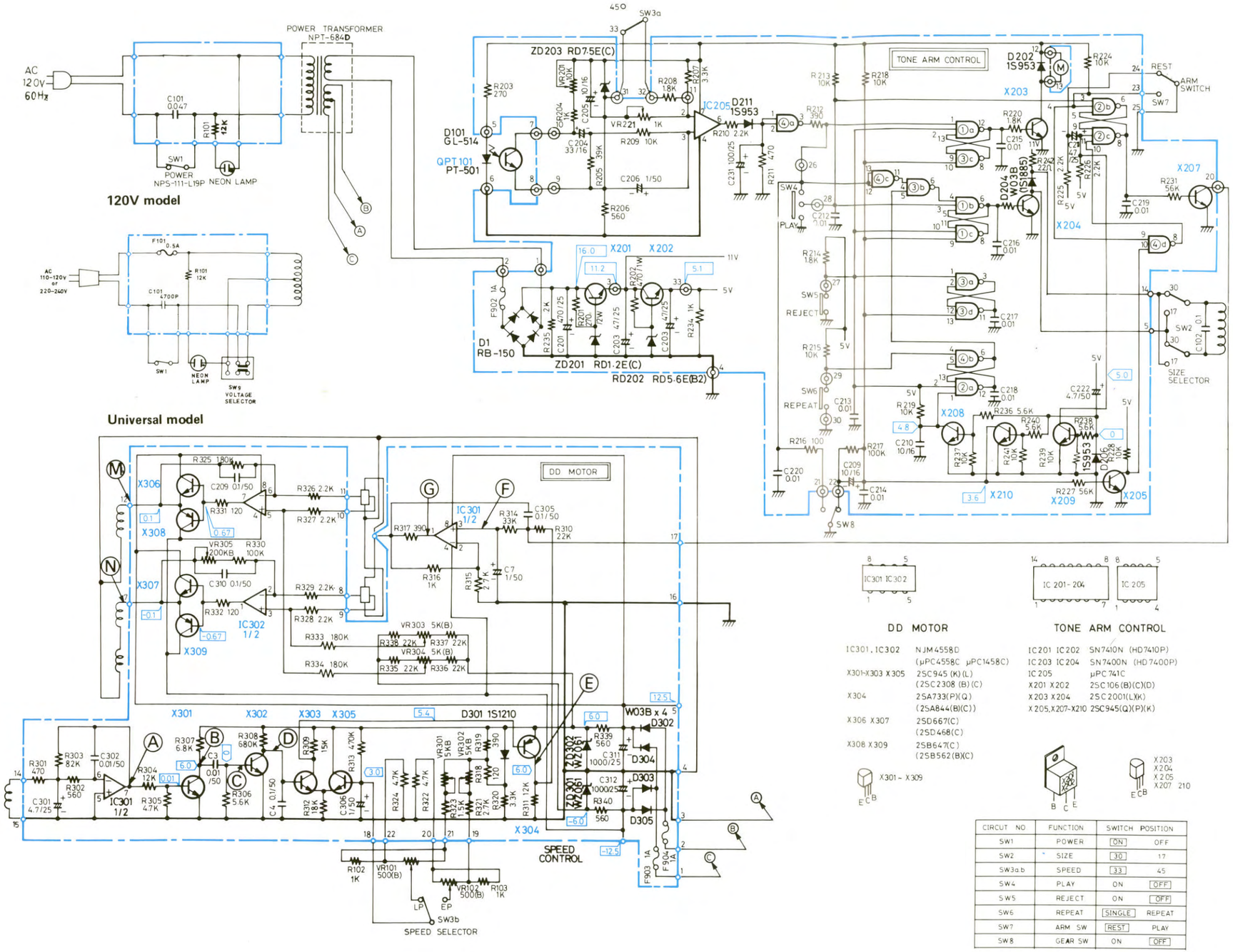


REF. NO.	PARTS NO.	DESCRIPTION
1	24506255	Mechanism chassis
2	24506256	Selector ass'y
3	893032	E-3.2, Circlip
4	24503082	Spring for selector
5	24503081	Main gear (2)
6	24503080	Main gear (1)
7	24503083	Gear (1)
8	24506257	Bracket for gear
8-1	24503084	Gear (2)
8-2	24502077	DML-148Q-1, DC motor
8-3	24506258	Bracket for gear
8-4	801212	M2. 6 x 6, Pan head machine screw
9	82113006	FM + 3 x 6, Pan head screw
10	24506259	Rotation plate
11	24506288	W5 x 13 x 1^{t}, Fieber washer
12	24502079	Friction gum
13	893040	E-4, Circlip
14	24506260	Switch arm
15	893020	E-3, Circlip
16	838130082	BT + 3 x 8, Tapping screw
17	24502080	Return solenoid ass'y
17-1	24506261	Sub-chassis
17-2	24506289	Magnet ass'y
17-3	24506262	Selector cam
17-4	82112006	FM + 2 x 6, Pan head screw
17-5	24506293	W3.1 x 6 x 0.1^{t}, Poly slider washer
17-6	24502081	Spool ass'y
17-7	893020	E-2, Circlip
17-8	82112604	FM + 2.6 x 4, Pan head screw
18	24503090	Switch ass'y
	24503040	K-1, Microswitch
	24503049	K-3, Microswitch
19	82112612	FM + 2.6 x 12, Pan head screw
20		Arm base ass'y
20-1	24506280	Arm base
20-2	24506282	Eccentric pin
20-3	24506287	E-4, Circlip
20-4	24503089	Arm spring
20-5	841130140	M3 x 14, Hexagone bolt
20-6	24506283	Eccentric pin
21	2405078-1	Control p.c.b.
22	831130082	TP + 3 x 8, Tapping screw
23	24506290	Sensor ass'y
23-1	24503085	Holder for sensor
23-2	24506268	Connector ass'y
23-3	260208	Binder
23-4	24506263	Bracket for sensor
23-5	82113006	FM + 3 x 6, Pan head screw
24	24505082	Power supply p.c.b. complete (UU)
	24505083	Power supply p.c.b. complete (UDN)
24-1	24506284	Power supply p.c.b.
24-2	24505068	Power supply cord (UU)
	24505076	Power supply cord (UDN)
24-3	211003	Neon lamp
25	24506285	Control pcb complete
25-1	24506272	Connector ass'y
25-2	24506271	Control p.c.b.
25-3	24503087	Push switch
26	24506294	Switch bracket ass'y (UU)
	24506350	Switch bracket ass'y (UDN)
26-1	5146015	VM10A-500ΩB, Variable resistor
26-4	24503086	Push switch
26-5	24506269	Record size p.c.b.
26-6	24506270	Speed control p.c.b.
26-7	24506266	Bracket for variable resistor
26-8	25035149	NPS-121-L113P, Power switch (UU)
	25035150	NPS-111-L114P, Power switch (UDN)
26-9	24506267	Seat for switch
26-10	24506265	Switch bracket (1)
26-11	838130082	BT3 x 6, Tapping screw
26-12	82113006	FM + 3 x 6, Pan head screw
27	24504272	Volume knob
28	28320303	Push button
29	24502078-1	DDM-511M-43, DD motor (UU)
	24502078-2	DDM-511M-42, DD motor (UDN)
30	833240124	FMT + 4 x 12, Tapping screw
31	230329	Power transformer (UU)
	230330	NPT-684D, Power transformer (UDN)
32	831140124	TP + 4 x 12, Tappinc screw
34	24505079	Terminal ass'y (UU)
	24505084	Terminal ass'y (UDN)
34-1	24505075	Outpu cord (UDN)
	24505061	output cord (UU)
34-2	24505012	Tube
34-3	24506151	Terminal
35	24501235	Tone arm ass'y (UU)
	24501242	Tone arm ass'y (UDN)
36	24506241	E-9, Circlip
37	24506244	FW10 x 22 x 1^{t}, Washer
38	24504278	Elevation shaft
39	24504279	Spring for elevation
40	893030	E-3, Circlip
41	24504280	Elevation plate
42	24506276	Lifter arm
43	24506277	Cueing lever
44	24506278	Lifter knob
45	24506279	Cam plate
46	83313006	FMT + 3 x 6, Tapping screw
47	24506275	Nut
48	24503088	Cam spring
49	24504270	IFC knob
50	24506243	Wave washer
51	24503077	IFC spring
52	24504271	IFC cam
53	831130082	3STW + 8BQ, Tapping screw
54	24501221	Arm rest
55	87113006	SSW3, Washer
56	861330	FLN3, Nut
57	24504281	Panel
58	24504263	Lamp cover
59	24504264	Holder for lamp
60	24506304	Bracket (UU)
	24506292	Bracket (UDN)

REF. NO.	PARTS NO.	DESCRIPTION
61	270280	3R-3K-4, Strainrelief (UU)
	270025	3R-3P-4, Strainrelief (UDN)
62	24509101	Leg (UU)
	24509169	Leg (UDN)
63	24509100	Leg (UU)
	24509170	Leg (UDN)
64	24506274	Receptacle for leg
65	24504277	Receptacle for leg
66	24509104	Mounting stud
67	24509157	Bottom board
68	24509126	Dust cover ass'y
68-1	24504275	Name plate
68-2	24509127	Cover
68-3	24509128	Cushion
69	24506234	Hinge
70	24502082	Turntable platter
71	24509111	T.T. mat
72	292049A	45 rpm adaptor
73		
76	24509156	Cabinet board
101	250159	Slide switch (UU)
102	24505065	Voltage plate (UU)
103	82113012	FM + 3 x 12, Pan head screw (UU)
104	838130082	Tapping screw (UU)

(UU): Only Universal model
(UDN): Only 120V model

SCHEMATIC DIAGRAM
MODEL CP-1020F



DD MOTOR

IC301, IC302	NJM4558D (μPC4558C μPC1458C)
X301-X303 X305	2SC945 (K)(L) (2SC2308 (B)(C)
X304	2SA733(P)(Q) (2SA844(B)(C))
X306 X307	2SD667(C) (2SD468(C)
X308 X309	2SB647(C) (2SB562(B)(C)

X301 ~ X309

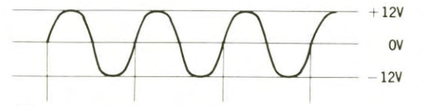
TONE ARM CONTROL

IC201 IC202	SN7410N (HD7410P)
IC203 IC204	SN7400N (HD7400P)
IC205	μPC741C
X201 X202	2SC106(B)(C)(D)
X203 X204	2SC2001(L)(K)
X205, X207~X210	2SC945(Q)(P)(K)

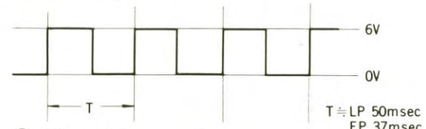
X203 X204 X205 X207 210

CIRCUT NO	FUNCTION	SWITCH POSITION	
SW1	POWER	[ON]	OFF
SW2	SIZE	[30]	17
SW3a,b	SPEED	[33]	45
SW4	PLAY	ON	[OFF]
SW5	REJECT	ON	[OFF]
SW6	REPEAT	[SINGLE]	REPEAT
SW7	ARM SW	[REST]	PLAY
SW8	GEAR SW	ON	[OFF]

Ⓐ OP Ampli. output

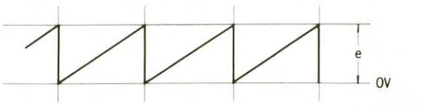


Ⓑ X301 Output

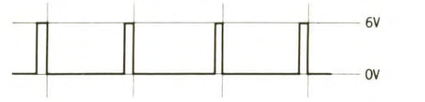


Ⓒ Differential comparation output

Ⓓ Saw tooth wave output



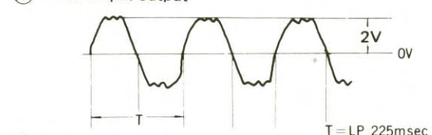
Ⓔ Differential circuit output



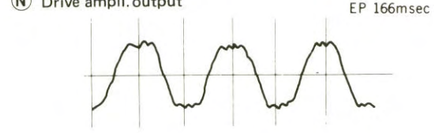
Ⓕ Filter output

Ⓖ Hall IC driver

Ⓜ Drive ampli. output



Ⓝ Drive ampli. output



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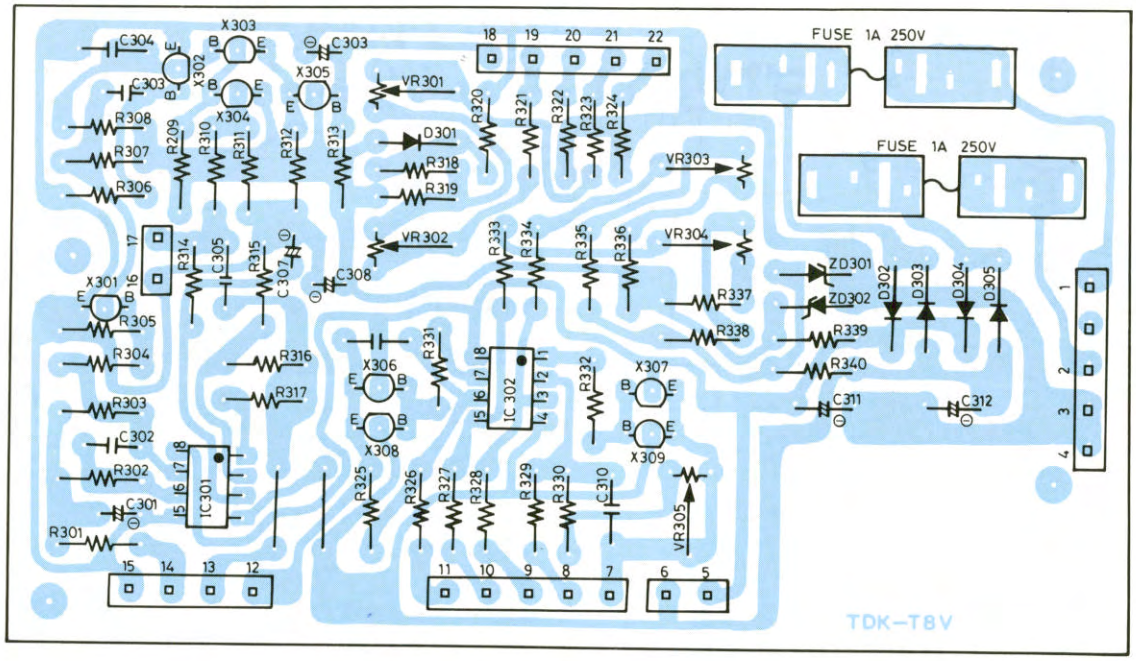
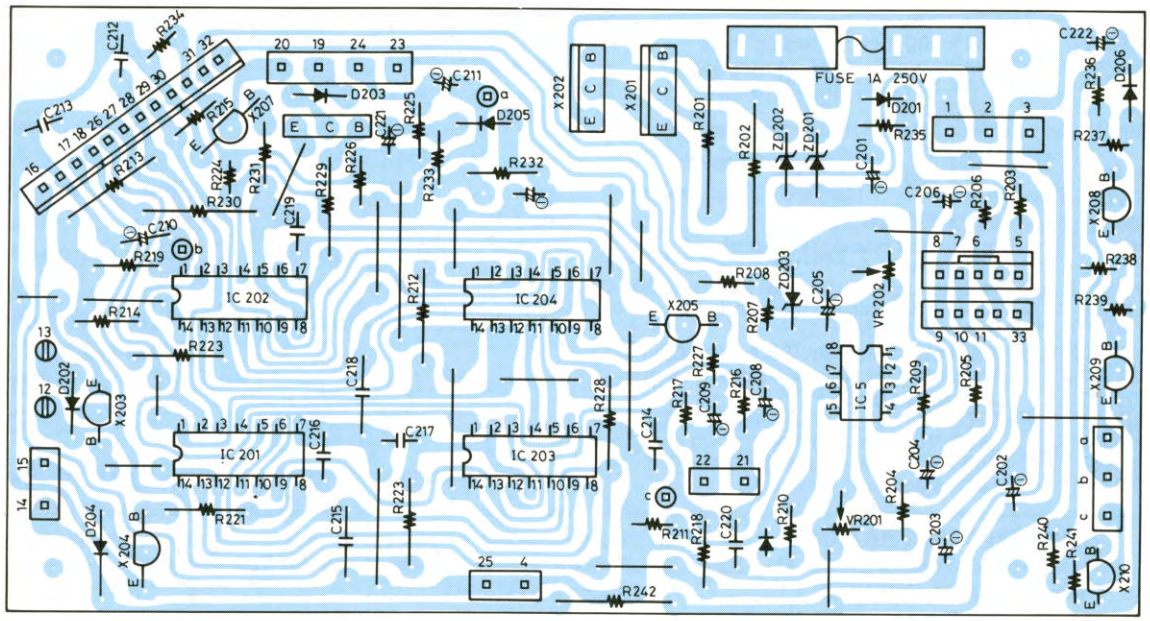
PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE

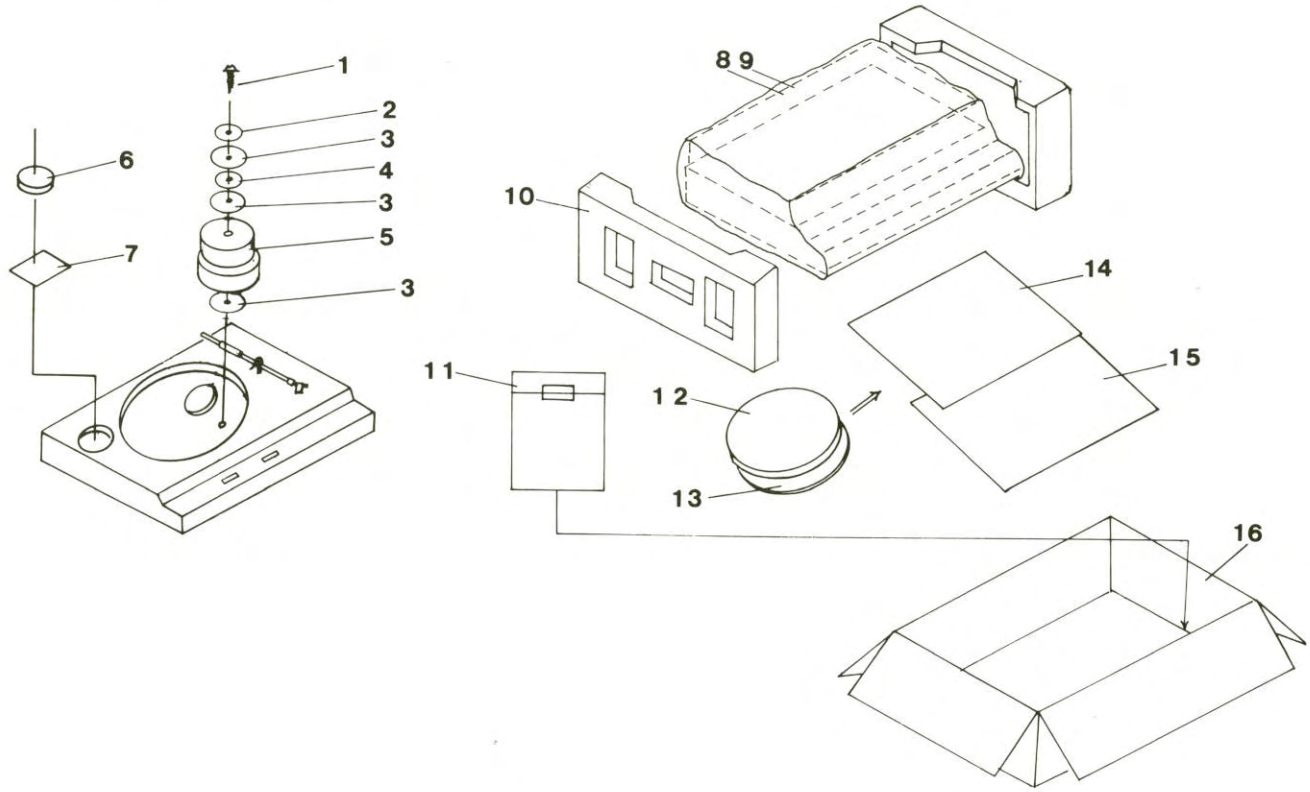
Tonearm control



Phono motor control



7. PACKING PROCEDURES



REF. NO.	PARTS NO.	DESCRIPTION
1	24509147	FMT±4 x 30, Screw
2	870063	FW4.6ϕ x 10ϕ x 0.5^t, Washer
3	24500464	Caution card
4	24506248	FW4.7 x 28 x 0.4, Washer
5	24501237	Counter weight
6	292049A	45 adaptor
7	24509061	Poly sheet
8	29095097	280 x 200 mm, Protection sheet (Power supply cord)
	29100042	550 x 550 mm, Protection sheet (Dust cover)
	29095012	800 x 500 mm, Protection sheet (Cabinet)
9	29100018	750 x 650 mm, Poly bag
10	24509139	Pad
11	29100005	220 x 330 mm, Poly bag
	29340319	Instruction manual (Universal and 240V model)
	29340343	Instruction manual (Only 120V model)
	25055018	CV-K-1, Conversion plug (Only Universal model)
	29365006	Warranty card (Only U.S.A. model)
	29365005-2	Warranty card (Only Germany model)
12	24502082	Turntable platter
13	24509111	T.T. mat
14	29100008	350 x 450 mm, Poly bag
15	24509162	500 x 420 mm, Bottom pad sheet
16	29050254	Carton box

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